US006189593B1

(12) **United States Patent**
Katchur et al.

(10) **Patent No.: US 6,189,593 B1**
(45) **Date of Patent: Feb. 20, 2001**

(54) **INJECTION MOLDED ROLL UP SECURITY CLOSURE**

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(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/500,674**

(22) Filed: **Feb. 9, 2000**

(51) **Int. Cl.**[7] **E06B 9/08**
(52) **U.S. Cl.** **160/133**; 160/229.1; 160/236
(58) **Field of Search** 160/133, 32, 35, 160/36, 33, 236, 229.1

(56) **References Cited**

U.S. PATENT DOCUMENTS

D. 297,463	8/1988	Greco	D25/50
D. 297,572	9/1988	Greco	D25/50
D. 297,573	9/1988	Greco	D25/50
D. 305,068	12/1989	Greco	D25/50
D. 323,714	2/1992	Greco	D25/50
634,072	10/1899	Spaulding .	
1,350,919	8/1920	Carlson .	
2,592,888	4/1952	Greegor	189/78
3,601,175	8/1971	Wardlaw	160/133
3,739,832	6/1973	Sivin	160/133
4,120,340	10/1978	Stascavage et al.	160/133
4,282,920	8/1981	Kremm	160/133
4,345,635	8/1982	Solomon	160/133
4,685,484	8/1987	Moneta	135/117
5,474,118	12/1995	Hoffman	160/235
5,515,902	5/1996	Hoffman	160/235
5,601,130	2/1997	Werner et al.	160/183
5,611,383	3/1997	Hoffman	160/133
5,909,762	6/1999	Denoual et al.	160/201
5,915,446	6/1999	De Zen	160/235

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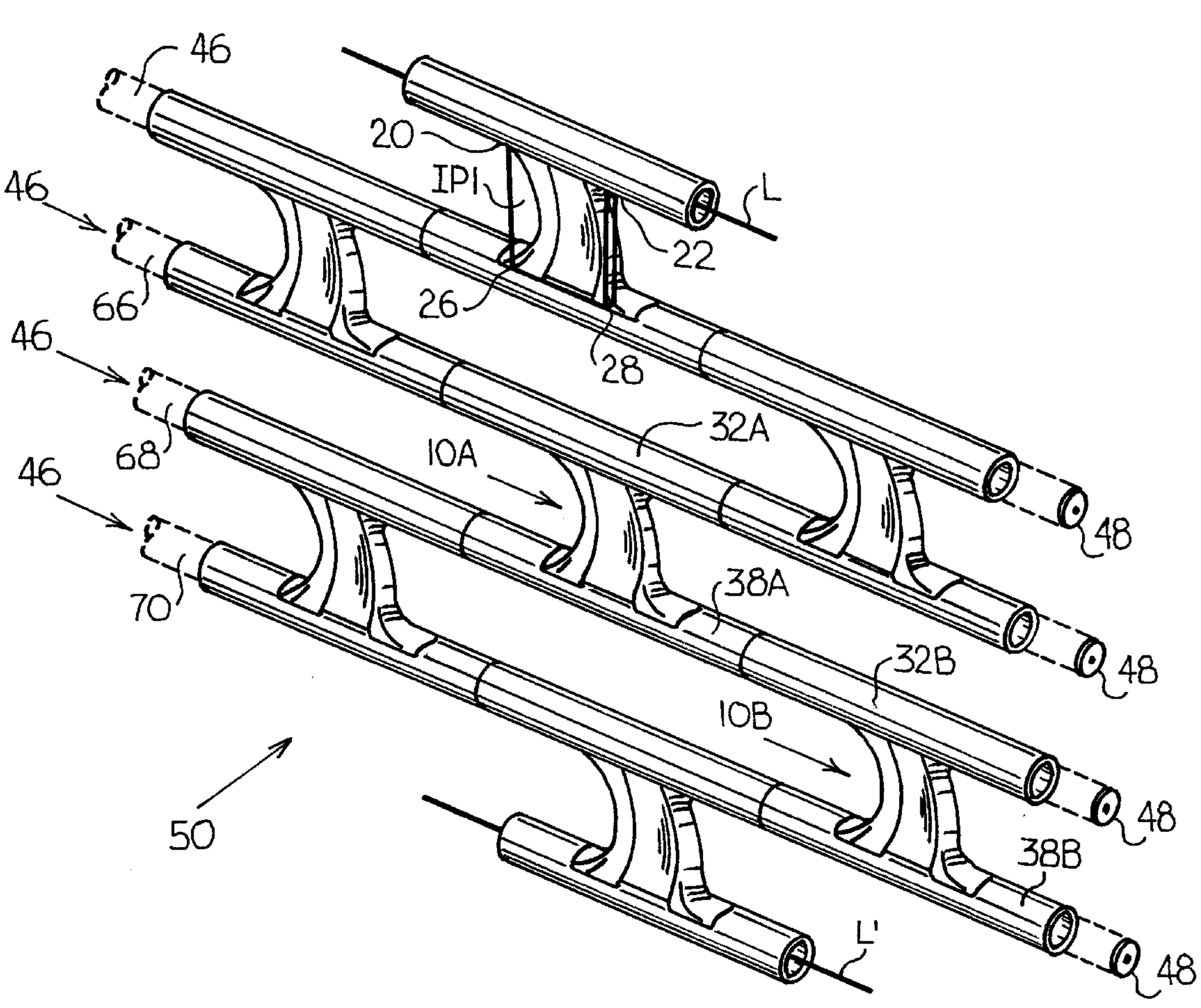
(57) **ABSTRACT**

The present invention is a security closure for a rolling security gate having a plurality of parallel rods. The security closure generally includes a first hollow conduit, a second hollow conduit, and a curved connector piece connecting the first hollow conduit to the second hollow conduit.

20 Claims, 4 Drawing Sheets



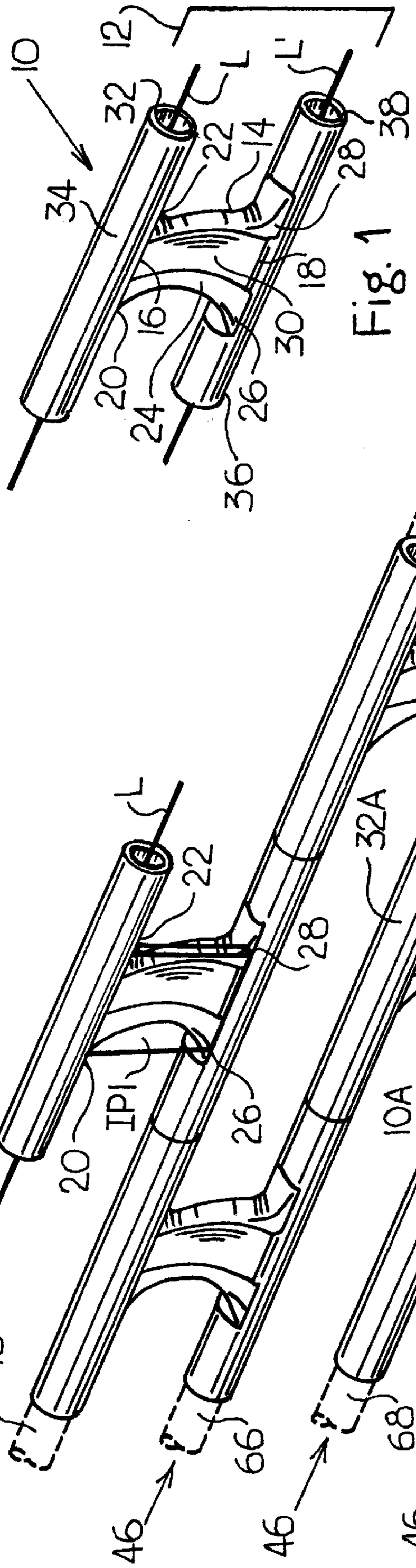


Fig. 1

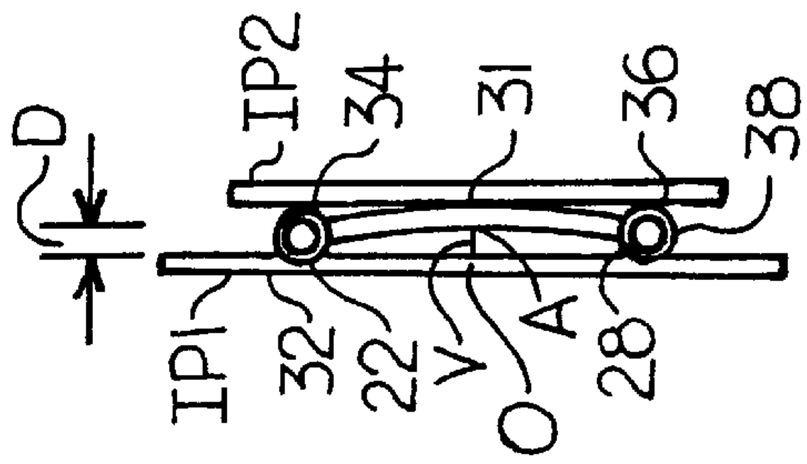


Fig. 1a

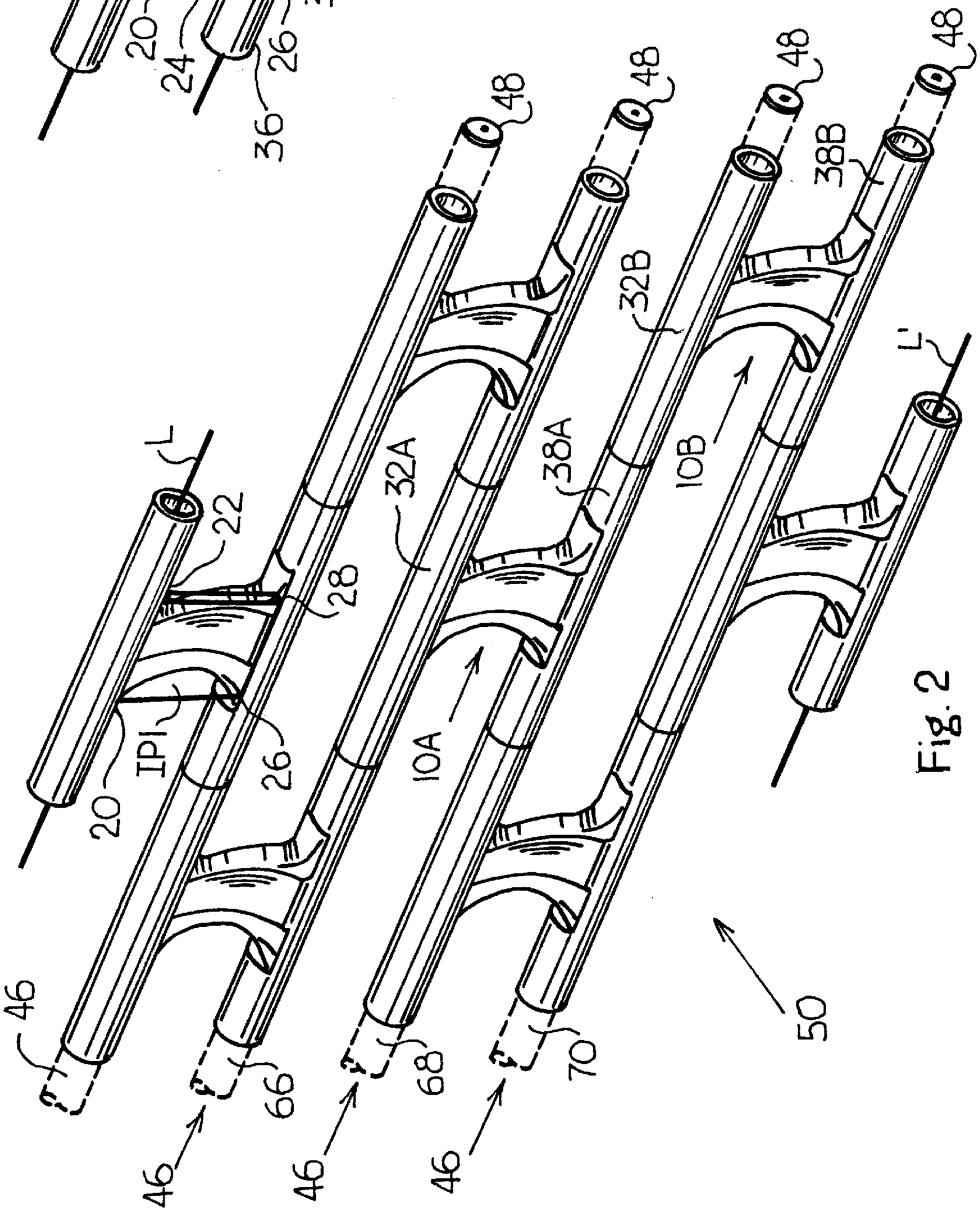


Fig. 2

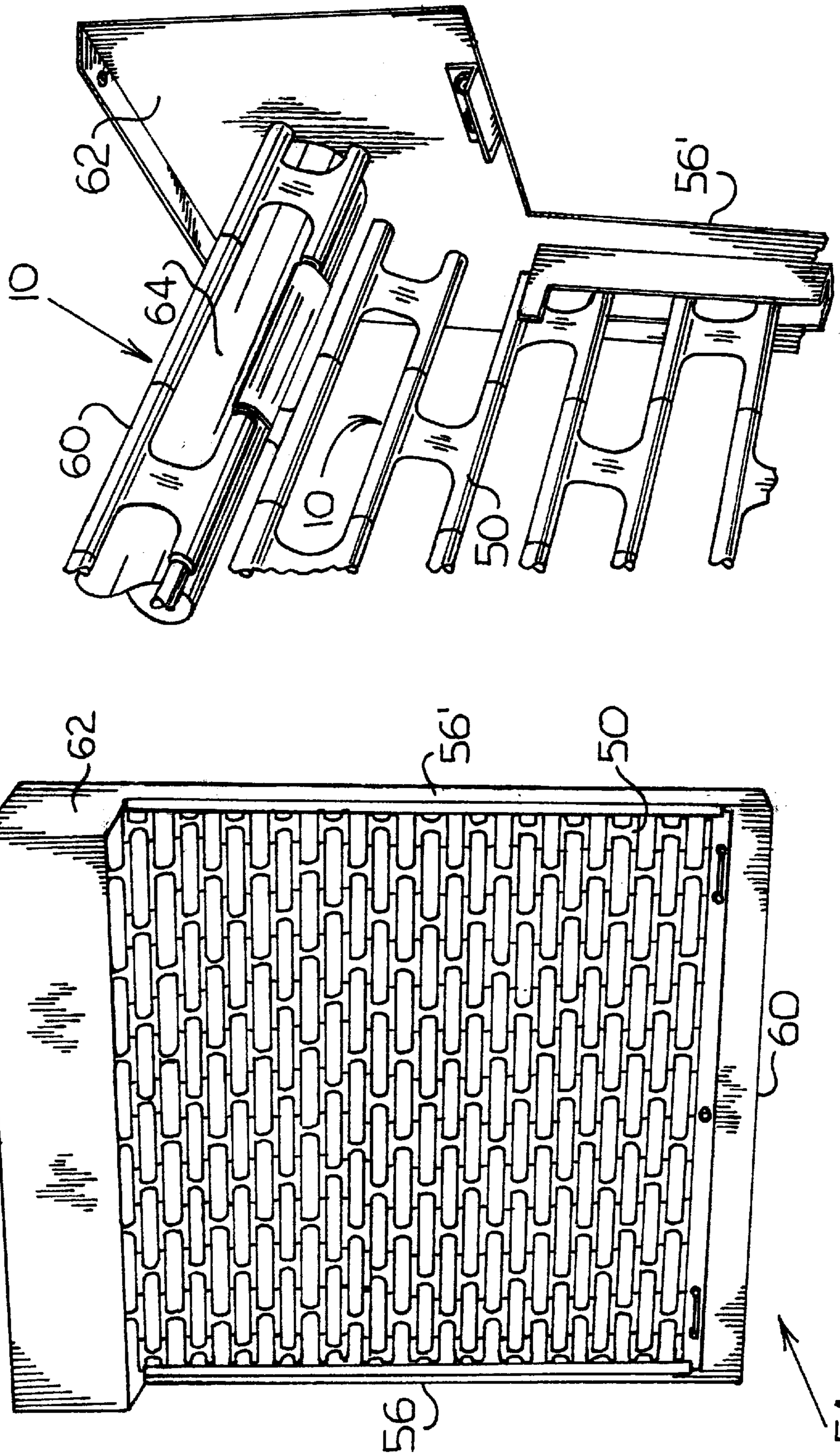


Fig. 4

Fig. 3

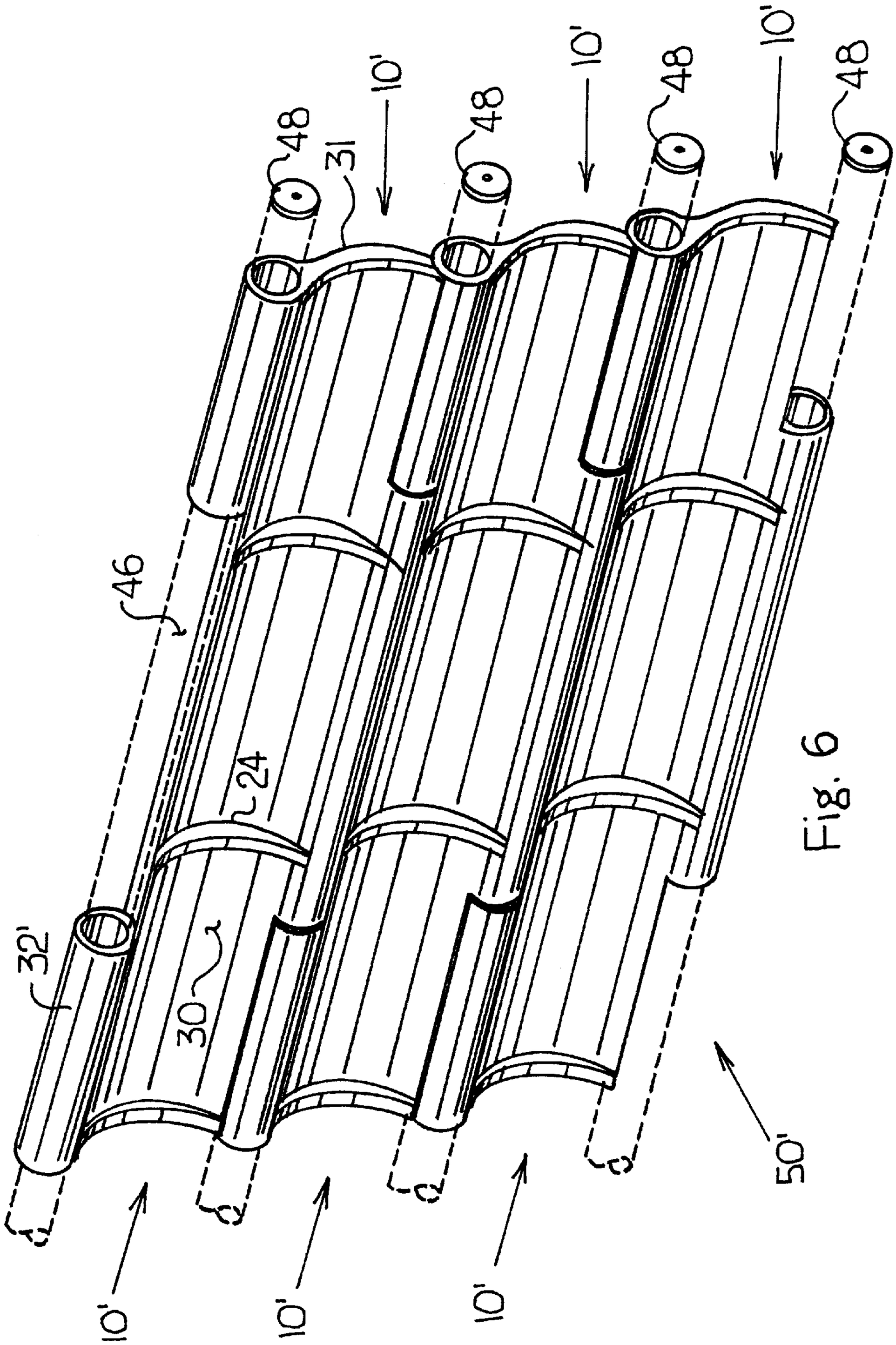


Fig. 6

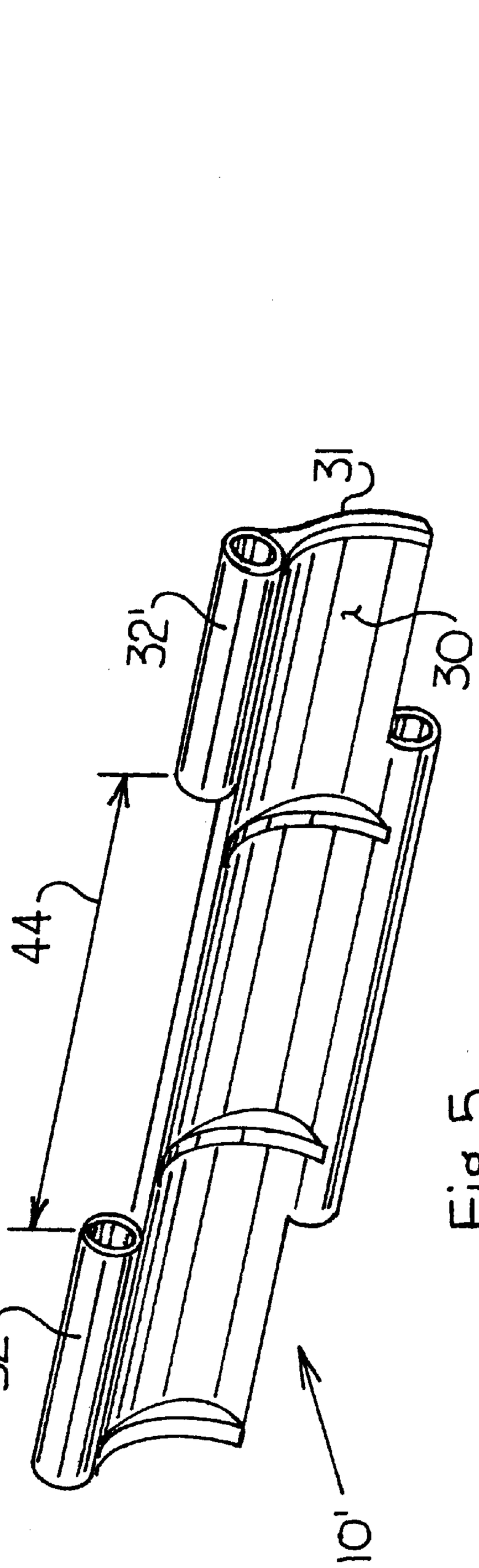


Fig. 5

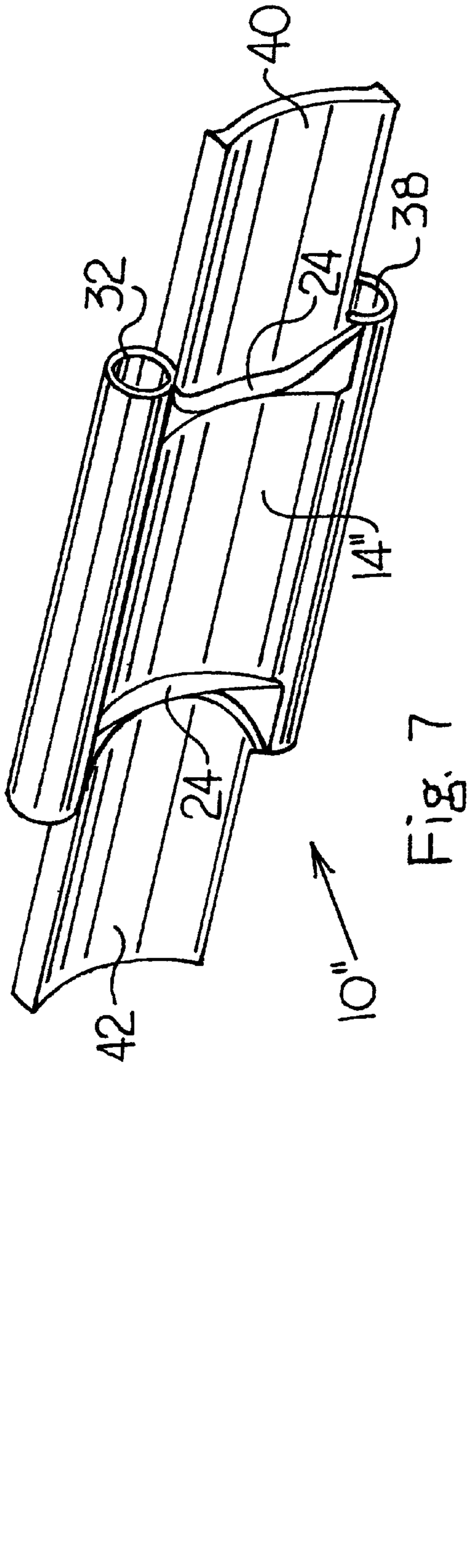


Fig. 7

INJECTION MOLDED ROLL UP SECURITY CLOSURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to rolling security gate assemblies and, more particularly, to rolling security gate assemblies having interlocking security closures.

2. Brief Description of the Prior Art

Rolling security gate assemblies are commonly used to barricade openings in structures, such as storefront entrances or window openings. As shown generally in U.S. Pat. No. 3,739,832, rolling security gate assemblies generally include a rolling security gate having a plurality of cylindrical rods connected together by a plurality of interspaced support pieces. The rolling security gate slides in tracks permanently attached to opposing jam portions of an entranceway or window. When access through the entranceway is desired, the rolling security gate is raised, wrapping around a cylindrically-shaped pipe shaft positioned at an apex sill of the entranceway or window. Conversely, when the rolling security gate is deployed to prevent access, the rolling security gate is pulled toward a nadir sill of the entranceway or window and locked in a closed position.

U.S. Pat. Nos. 4,282,920 and 4,120,340 both disclose transparent, planar-shaped security closures that fit between neighboring parallel rods of a rolling security gate. These transparent security closures keep unwanted objects from being inserted between neighboring rods, yet still allow sales merchandise inside a store to be seen by a passing consumer. However, rolling security gates of this type are also difficult to see in poorly lit areas due to the small diameter of the rods and do not warn prospective criminals that the rolling security gate is present. Visually deterring prospective criminals is desirable, especially if the rolling security gate is set back from a store window, because prospective criminals may be less likely to break the store window if they see that a rolling security gate will hamper their ingress into the store after the window is broken. However, in some applications, the visual deterrent should not substantially impair the ability of a consumer, shopper, or other invitee from viewing merchandise located on an opposite side of the security gate.

A problem with rolling security gates having planar-shaped security closures is that the closure pieces prevent the rolling security gate assemblies from rolling compactly around the pipe shaft. This translates into larger gate storage housings which further translates into higher manufacturing and installation costs, especially if a rolling security gate has to be specially made to fit a pre-existing entranceway or window frame. Moreover, a larger gate storage housing is harder to hide from view, making the rolling security gate less attractive.

SUMMARY OF THE INVENTION

The present invention solves the problem associated with rolling security gate assemblies having security closures by providing a security closure having a molded body. The molded body forms a curved connector, a first hollow conduit, and a second hollow conduit. The curved connector has a first end and a second end, with the first end extending between a first endpoint and a second endpoint. The second end is positioned substantially parallel to the first end and extends between a third endpoint and a fourth endpoint. A concave surface and a convex surface connect the first end and the second end. The concave surface faces an imaginary plane passing through the first endpoint and the second endpoint of the first end of the curved connector and the third endpoint and fourth endpoint of the second end of the curved connector.

The first hollow conduit forms a first exterior surface and extends along a first conduit axis, with the first conduit axis passing along the first endpoint of the first end of the curved connector and perpendicular to the second endpoint of the first end of the curved connector. A second hollow conduit forms a second exterior surface and extends along a second conduit axis, with the second conduit axis passing along the third endpoint of the second end of the curved connector and the fourth endpoint of the second end of the curved connector. The second conduit axis is also parallel to the first conduit axis.

The security closure provides a visual deterrent to prospective criminals. The curved connector of the security closure permits the rolling security gate attached thereto to be wrapped more compactly around the cylindrical rolling gate storage shaft when the rolling security gate is retracted into the gate storage housing. The compact wrapping reduces the overall diameter of the gate storage housing. Because rolling security gate assemblies are often used in storefronts or behind glass windows, space considerations have utilitarian, economic, and aesthetic implications.

It is therefore an object of the present invention to provide a security closure device that compactly wraps around a cylindrical gate storage shaft and provides a visual deterrent.

These and other advantages of the present invention will be clarified in the description of the preferred embodiments taken together with the attached drawings in which like reference numerals represent like elements throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a security closure according to a first embodiment of the present invention;

FIG. **1**A is a side view of the security closure shown in FIG. **1**;

FIG. **2** is a back view of a plurality the security closures shown in FIG. **1** assembled on a plurality of rods;

FIG. **3** is a back view of the rolling security gate with the security closures shown in FIGS. **1**, **1**A, and **2** installed;

FIG. **4** is a back view of a rolling security gate assembly with the security closures shown in FIGS. **1**, **1**A, **2**, and **3** installed;

FIG. **5** is a perspective view of a security closure according to a second embodiment of the present invention;

FIG. **6** is a back view of a plurality of the security closures shown in FIG. **5** assembled on a plurality of rods; and

FIG. **7** is a perspective side view of a security closure according to a third embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

One embodiment of the present invention is shown in FIGS. **1**–**4**. A second embodiment is shown in FIGS. **5** and **6**. A third embodiment is shown in FIG. **7**.

As shown in FIGS. **1**–**4**, and with particular reference to FIG. **1**, the present invention is a security closure **10** having a body **12** forming a curved connector **14**. The curved connector **14** has a first end **16** and a second end **18**. The first end **16** of the curved connector **14** extends between a first endpoint **20** and a second endpoint **22**, and is positioned

substantially parallel to the second end **18** of the curved connector **14**. The second end **18** of the curved connector **14** extends between a third endpoint **26** and a fourth endpoint **28**. A concave surface **30** and a convex surface **31** of the curved connector **14** connect the first end **16** of the curved connector **14** to the second end **18** of the curved connector **14**. The concave surface faces an imaginary plane IP1 passing through the first endpoint **20** and the second endpoint **22** of the first end **16** of the curved connector **14** and the third endpoint **26** and fourth endpoint **28** of the second end **18** of the curved connector **14**. The curvature C of the concave surface **30** is defined by a curvature vector V originating at a point O on the imaginary plane IP1, equidistant from the first and second ends **16**, **18** of the curved connector **14**. The curvature vector V is not necessarily a radius, and therefore may increase in length D, decrease in length D, or maintain a static length D over the curvature C. Ideally, the length D of the curvature vector V between the point O on the imaginary plane IP1 and an apex A of the curvature C is between ¼ inches and 9/32 inches.

A first hollow conduit **32** forms a first exterior surface **34** and extends along a first hollow conduit axis L, with the first conduit axis L passing along the first endpoint **20** of the first end **16** of the curved connector **14** and the second endpoint **22** of the curved connector **14**. The first hollow conduit **32** is preferably a seamless, cylindrical tube.

A second hollow conduit **38** forms a second exterior surface **36** and extends along a second hollow conduit axis L', with the second conduit axis L' passing along the third endpoint **26** of the second end **18** of the curved connector **14**, and to the fourth endpoint **28** of the curved connector **14**, and positioned parallel to the first conduit axis L. The second hollow conduit **38** is also preferably a seamless, hollow tube.

As shown in FIG. **1A**, the convex surface **31** of the curved connector **14**, the first exterior surface **34** of the first hollow conduit **32**, and the second exterior surface **36** of the second hollow conduit **38** all lie in the same imaginary plane IP2. This common alignment produces a uniform contact surface for successive layers of security closures **10** as the security closures **10** are wrapped around the pipe shaft **64** (discussed below), allowing the security closures **10** to be more compactly wrapped around the pipe shaft **64** (discussed below).

In a second embodiment of a security closure **10'** shown in FIGS. **5** and **6**, the first hollow conduit **32'** forms a void **44** that separates the first hollow conduit **32'** into two sections. These security closures **10** form an opaque rolling security gate **50'**, as shown in FIG. **6**. In a third embodiment security closure **10"**, shown in FIG. **7**, a third end **40** of the curved connector **14"** extends beyond the first hollow conduit **32** and the second hollow conduit **38**, and a fourth end **42** of the curved connector **14"** extends beyond the first hollow conduit **32** and the second hollow conduit **38**. This embodiment also forms an opaque rolling security gate.

Because the first, second, and third embodiments of the security closures **10**, **10'**, **10"** are similar in many respects, with like reference numerals indicating like parts, the remaining portion of this document will refer only to the first embodiment security closure **10** and the first embodiment rolling security gate **50** (discussed below). However, unless otherwise noted, reference to the first embodiment security closure **10** also includes reference to the second embodiment security closure **10'** and the third embodiment security closure **10"**. Reference to the first embodiment rolling security gate **50** (discussed below) also includes reference to the second embodiment rolling security gate **50'** (discussed below), shown in FIG. **4**.

As shown in FIG. **1**, the curved connector **14**, first hollow conduit **32**, and second hollow conduit **38** of the security closure **10** are preferably integrally formed from a non-flexible material, such as nylon, glass-filled nylon, acrylonitrile butadiene styrene, or other suitable material. Reinforcing ribs **24** are also positioned adjacent the concave surface **30** of curved connector **14** to add further strength and stability.

As shown in FIG. **2**, a plurality of security closures **10**, a plurality of rods **46**, and a plurality of endcaps **48** are used to create a rolling security gate **50**. Each of the security closures **10** is pivotally connected to a pair of rods **46**, with endcaps **48** preventing the security closures **10** from falling off the rods **46**. As shown in FIGS. **3** and **4**, and with continuing reference to FIG. **2**, the rolling security gate **50** is part of a rolling gate security assembly **52** having a frame **54** forming opposing parallel sides **56**, **56'**, a first sill member **58**, and a second sill member **60**. A gate storage housing **62** is positioned adjacent the first sill member **58** of the frame **54** and a cylindrically-shaped pipe shaft **64** is positioned adjacent the gate storage housing **62**. The rolling security gate **50** is connected to the pipe storage shaft **64** and is movable with respect to the opposing parallel sides **56**, **56'** of the frame **54**.

As shown in FIG. **2**, one method of constructing the rolling security gate **50** includes positioning a first rod **66**, a second rod **68**, and a third rod **70** parallel to one another. The next step is inserting the first rod **66** into the first hollow conduit **32**A of a first security closure **10**A. The second rod **68** is then inserted through the second hollow conduit **38**A of the first security closure **10**A and through the first hollow conduit **32**B of a second security closure **10**B. The third rod **70** is then inserted through the second hollow conduit **38**B of the second security closure **10**B. This process is continued, forming the patterns shown in FIGS. **2**, **4**, and **6**, by adding subsequent rows of rods **44**, additional endcaps **48**, and additional security closures **10**, **10'**, **10"**.

As described above, the present invention provides a physical barrier that is also a visual deterrent. Moreover, the curvature of the security closures allows a rolling security gate equipped with the security closures to wrap more compactly around a cylindrically-shaped pipe shaft. This efficient wrapping decreases the size of the gate storage housing, resulting in economical and practical advantages.

The invention has been described with reference to the preferred embodiment. Obvious modifications and alterations will occur to others upon reading and understanding the preceding detailed description. It is intended that the invention be construed as including all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

We claim:

1. A security closure comprising:

a molded body, the molded body forming

a curved connector having a first end extending between a first endpoint and a second endpoint, a second end positioned substantially parallel to the first end and extending between a third endpoint and a fourth endpoint, a concave surface and a convex surface connecting the first end and the second end, the concave surface facing an imaginary plane passing through the first endpoint and the second endpoint of the first end of the curved connector and the third endpoint and fourth endpoint of the second end of the curved connector;

a first hollow conduit forming a first exterior surface and extending along a first conduit axis, with the first

conduit axis passing along the first endpoint of the first end of the curved connector and the second endpoint of the first end of the curved connector; and

a second hollow conduit forming a second exterior surface and extending along a second conduit axis, with the second conduit axis passing along the third endpoint of the second end of the curved connector and the fourth endpoint of the second end of the curved connector, and positioned parallel to the first conduit axis.

2. The security closure as claimed in claim **1** wherein the first hollow conduit forms a void that separates the first hollow conduit into two sections.

3. The security closure as claimed in claim **1** wherein a third end of the curved connector extends beyond the first hollow conduit and the second hollow conduit and a fourth end of the curved connector extends beyond the first hollow conduit and the second hollow conduit.

4. The security closure as claimed in claim **1** further comprising reinforcing ribs positioned adjacent the concave surface of the curved connector.

5. The security closure as claimed in claim **1** wherein the convex surface of the curved connector, the first exterior surface of the first hollow conduit, and the second exterior surface of the second hollow conduit all lie in the same plane.

6. The security closure as claimed in claim **1** wherein a curvature of the concave surface of the curved connector is defined by a curvature vector originating at a point on the imaginary plane, equidistant from the first and second ends of the curved connector, wherein the length of the curvature vector between the point on the imaginary plane and an apex of the concave surface is between ¼ inches and 9/32 inches.

7. The security closure as claimed in claim **1** wherein the molded body is made from a material selected from the group consisting of nylon, glass-filled nylon, and acrylonitrile butadiene styrene.

8. A rolling security gate assembly comprising:

a frame having opposing parallel sides, a first sill member, and a second sill member;

a gate storage housing positioned adjacent the first sill member of the frame;

a pipe shaft positioned adjacent the gate storage housing;

a rolling security gate connected to the pipe shaft and movable with respect to the opposing jam members of the frame, the rolling security gate having at least one pair of rods, a plurality of security closures pivotally connected to the at least one pair of rods, with each security closure having a body forming

a curved connector having a first end extending between a first endpoint and a second endpoint, a second end positioned substantially parallel to the first end and extending between a third endpoint and a fourth endpoint, a concave surface and a convex surface connecting the first end and the second end, the concave surface facing an imaginary plane passing through the first endpoint and the second endpoint of the first end of the curved connector and the third endpoint and fourth endpoint of the second end of the curved connector;

a first hollow conduit forming a first exterior surface and extending along a first conduit axis, with the first conduit axis passing along the first endpoint of the first end of the curved connector and the second endpoint of the first end of the curved connector; and

a second hollow conduit forming a second exterior surface and extending along a second conduit axis, with the second conduit axis passing along the third endpoint of the second end of the curved connector and the fourth endpoint of the second end of the curved connector, and positioned parallel to the first conduit axis.

9. The rolling security gate as claimed in claim **8** wherein the first hollow conduit forms a void that separates the first hollow conduit into two sections.

10. The rolling security gate as claimed in claim **8** wherein a third end of the curved connector extends beyond the first hollow conduit and the second hollow conduit and a fourth end of the curved connector extends beyond the first hollow conduit and the second hollow conduit.

11. The rolling security gate as claimed in claim **8** further comprising reinforcing ribs positioned adjacent the concave surface of curved connector.

12. The rolling security gate as claimed in claim **8** wherein the convex surface of the curved connector, the first exterior surface of the first hollow conduit, and the second exterior surface of the second hollow conduit all lie in the same plane.

13. The rolling security gate as claimed in claim **8** wherein a curvature of the concave surface of the curved connector is defined by a curvature vector originating at a point on the imaginary plane, equidistant from the first and second ends of the curved connector, wherein the length of the curvature vector between the point on the imaginary plane and an apex of the concave surface is between ¼ inches and 9/32 inches.

14. The security closure as claimed in claim **8** wherein the molded body is made from a material selected from the group consisting of nylon, glass-filled nylon, and acrylonitrile butadiene styrene.

15. A security closure for a rolling security gate comprising:

a molded body, the molded body forming

a curved connector having a first end extending between a first endpoint and a second endpoint, a second end positioned substantially parallel to the first end and extending between a third endpoint and a fourth endpoint, a concave surface and a convex surface connecting the first end and the second end, the concave surface facing an imaginary plane passing through the first endpoint and the second endpoint of the first end of the curved connector and the third endpoint and fourth endpoint of the second end of the curved connector;

a first hollow conduit forming a first exterior surface and extending along a first conduit axis, with the first conduit axis passing along the first endpoint of the first end of the curved connector and the second endpoint of the first end of the curved connector; and

a second hollow conduit forming a second exterior surface and extending along a second conduit axis, with the second conduit axis passing along the third endpoint of the second end of the curved connector and the fourth endpoint of the second end of the curved connector, and positioned parallel to the first conduit axis,

wherein the concave surface faces an imaginary plane passing through the first endpoint and the second endpoint of the first end of the curved connector and the third endpoint and fourth endpoint of the second end of the curved connector, the curvature of the concave surface of the curved connector is defined by a curvature vector originating at a point on the imaginary plane, equidistant from the first and second ends of the curved connector, the length of the curvature vector

between the point on the imaginary plane and an apex of the concave surface is between ¼ inches and 9/32 inches, and the convex surface of the curved connector, the first exterior surface of the first hollow conduit, and the second exterior surface of the second hollow conduit all lie in the same plane.

16. The security closure as claimed in claim **15** wherein the first hollow conduit forms a void that separates the first hollow conduit into two sections.

17. The security closure as claimed in claim **15** wherein a third end of the curved connector extends beyond the first hollow conduit and the second hollow conduit and a fourth end of the curved connector extends beyond the first hollow conduit and the second hollow conduit.

18. The security closure as claimed in claim **15** further comprising reinforcing ribs positioned adjacent the concave surface of curved connector.

19. The security closure as claimed in claim **15** wherein the curved connector is a solid piece.

20. The security closure as claimed in claim **15** wherein the molded body is made from a material selected from the group consisting of nylon, glass-filled nylon, and acrylonitrile butadiene styrene.

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